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subject: Photographic Coverage on Apollo 16  
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MEMORANDUM FOR FILE

An objective of the SIM photographic complement on the J-missions is to maximize the lunar surface areal coverage while minimizing the photographic overlap with the photography obtained on previous missions. However, the geometry of the Apollo 16 site (Descartes) in relation to the Apollo 15 site (Hadley-Apennine) means that the Apollo 16 groundtracks will overlap those of Apollo 15 on the frontside (40°E - 100°E) and this overlapping region will be in sunlight. Since the Apollo 16 SIM Bay experiment complement is identical to that of Apollo 15, those orbital experiments which require an illuminated lunar surface (Panoramic Camera, Mapping Camera, X-Ray Spectrometer) will obtain overlapping coverage in this region. Those experiments which do not require an illuminated lunar surface (Laser Altimeter, Gamma-Ray Spectrometer, Alpha-Particle Spectrometer, Mass Spectrometer) will overlap the Apollo 15 coverage in the equatorial region from 80°W - 140°W in addition to 40°E - 100°E.

Figure 1 indicates the extent of the Panoramic Camera coverage which will be obtained on Apollo 16 and shows the region of overlap with the PC photography acquired on Apollo 15. (Expecting such overlap, the flight plan of Apollo 15 called for photographing this region monoscopically in order to conserve film for stereo photography of other areas.) The extent of the Apollo 16 Mapping Camera photography is shown in Figure 2 and the region of overlap with the Apollo 15 MC photography indicated. The comparison between the total area overflowed on Apollos 15 and 16 and the areal extent of the Panoramic (both rectified and total) and Mapping Camera coverage acquired on the two missions is compiled in Table I. The Table shows that the total non-redundant area overflowed on Apollo 16 between LOI and TEI is  $1.75 \times 10^6 \text{ km}^2$ , 4.6% of the total lunar surface area; the total non-redundant area overflowed on both Apollos 15 and 16 is  $8.50 \times 10^6 \text{ km}^2$ , ~22.1% of the total surface area. The





new Mapping Camera coverage will be  $1.74 \times 10^6 \text{ km}^2$ ,  $\sim 4.5\%$  of the total surface area and the total non-redundant MC coverage on both Apollos 15 and 16 will be  $\sim 14.8\%$  of the total surface area.

The photographic coverage obtained by both the PC and MC on Apollo 16 will include the Ranger 7 and Ranger 9 impact craters and the Luna 16 site (also photographed on Apollo 15), in addition to diverse areas of photogeological interest (such as Alphonsus and northern Gassendi).

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2015-WLP-ams

Attachments

TABLE I

Total Areal Coverage with the Apollo 15 and 16  
Photographic Complement ( $\times 10^6 \text{ km}^2$ )\*

|   | Apollo 15    | Apollo 16   |             | Total Non-Redundant<br>Coverage on Apollos<br>15 and 16 |
|---|--------------|-------------|-------------|---|
|   |              | Total       | New         |   |
| Total Area Overflown<br>Between Groundtracks<br>LOI - TEI | 6.75 (17.5%) | 3.02 (8.0%) | 1.75 (4.6%) | 8.50 (22.1%)  |
| MC Vertical   | 3.94 (10.3%) | 2.34 (6.2%) | 1.74 (4.5%) | 5.68 (14.8%)  |
| PC Rectified  | 2.58 (6.7%)  | 1.86 (4.9%) | 1.44 (3.8%) | 4.02 (10.7%)  |
| PC Total  | 4.45 (11.5%) | 3.30 (8.7%) | 2.53 (6.6%) | 6.98 (18.1%)  |
| MC Obliques   | 8.4 (22%)    |             |             |   |

\*Total area of moon -  $38 \times 10^6 \text{ km}^2$ .

Numbers in parenthesis refer to percent of entire moon.

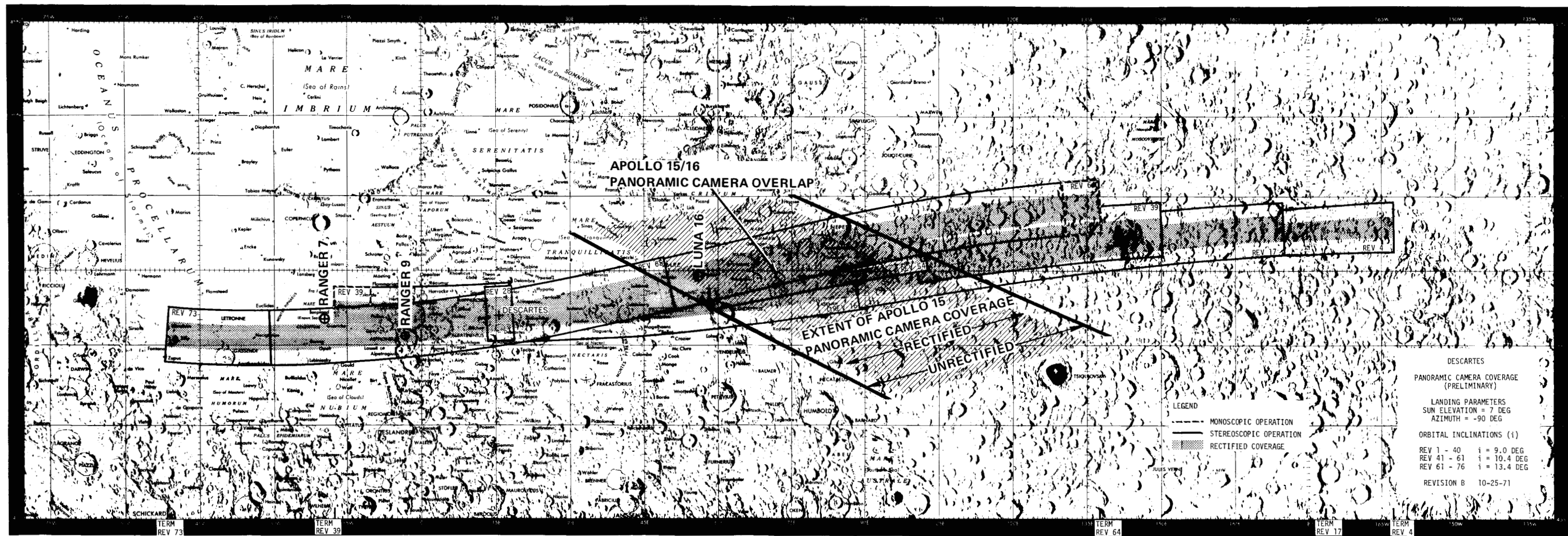


FIGURE 1 - APOLLO 16 PANORAMIC CAMERA COVERAGE

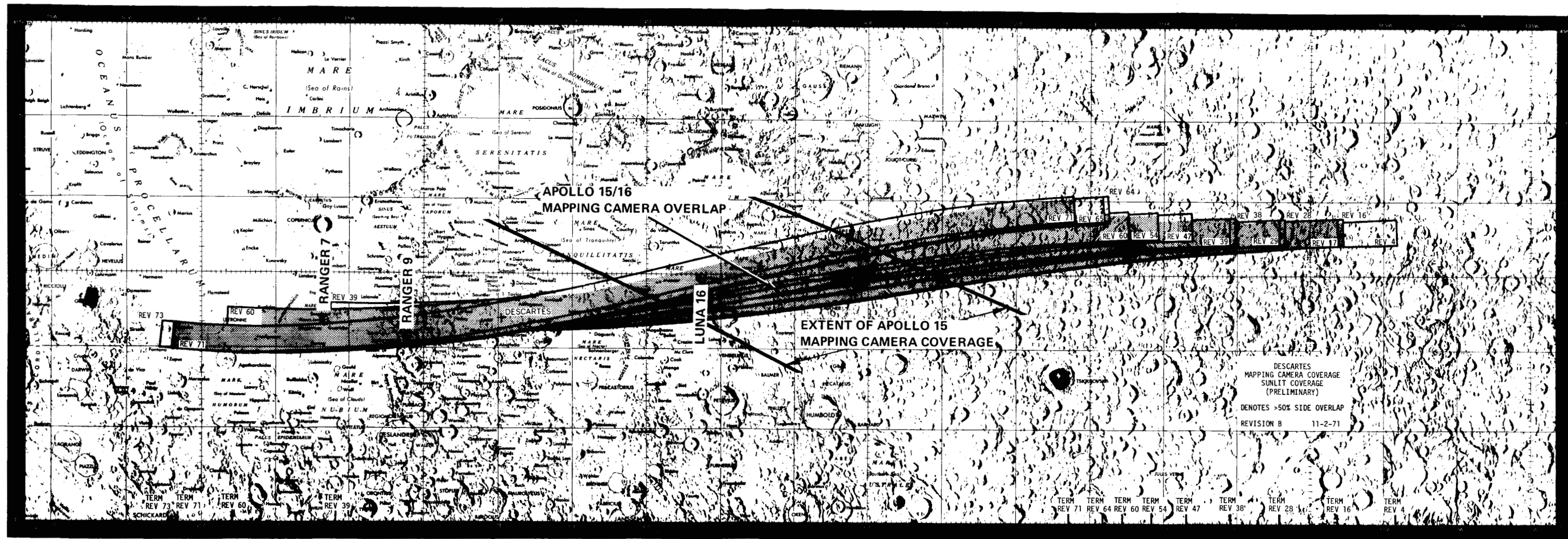


FIGURE 2 - APOLLO 16 MAPPING CAMERA COVERAGE